

ABSTRACT OF THE DISCLOSURE

A method and apparatus is provided for determining thickness of films or layers during chemical-mechanical planarization/polishing (CMP) of a semiconductor substrate or wafer in situ. The method may be used to determine end-point during CMP especially of oxide films deposited on the substrate or wafer. In one embodiment, the method includes: a) capturing images of the surface of the substrate using high speed imaging; b) performing pattern recognition on the captured images; c) selecting one of the captured images based on the pattern recognition; and d) converting the selected image into a thickness measurement. In one form, the high speed imaging comprises a high speed camera, while in another form, the high speed imaging comprises a conventional camera and a laser pulse or flash tube. In yet another embodiment, reflective laser interference patterns of the substrate are captured and analyzed for interference pattern changes that can signal a practical end-point.